

## Freeform Search

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	<b>US Patents Full-Text Database</b>
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**Term:** (network\$ with monitoring with testing).ab.

**Display:** 10 **Documents in Display Format:** KWIC **Starting with Number** 1

**Generate:** ☐ Hit List ☒ Hit Count ☐ Side by Side ☐ Image

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### Search History

**DATE:** Wednesday, July 06, 2005 [Printable Copy](#) [Create Case](#)

#### Set Name Query

side by side

DB=USPT; PLUR=YES; OP=ADJ

L3 L1 and (transmit\$ with test\$ with data with network\$)

L2 L1 and (scenario\$)

L1 (network\$ with monitoring with testing).ab.

#### Hit Count Set Name

result set

4 L3

1 L2

29 L1

END OF SEARCH HISTORY

41/3, 9, 14, 28  
6, 625, 648  
5, 917, 828

## Hit List

Clear	Generate Collection	Print	Fwd Refs	Blwd Refs
Generate OACS				

Search Results - Record(s) 1 through 10 of 29 returned.

☐ 1. Document ID: US 6847916 B1

L1: Entry 1 of 29

File: USPT

Jan 25, 2005

DOCUMENT-IDENTIFIER: US 6847916 B1

TITLE: Method and system for monitoring, controlling, and locating portable devices performing remote diagnostic analysis of control network

Abstract Text (1):

A system and method for monitoring, diagnosing and/or testing a control network using portable, wireless equipment includes computerized display device connected to a wireless intermediary device for allowing a wireless connection to be made to a control network. The computerized diagnostic device may be embodied as a personal digital assistant (PDA) having a graphical screen display, on which may be displayed the network nodes and connections of the control network presented against a backdrop of a transit vehicle or other facility shown in three-dimensional, rotatable images. The wireless equipment may allow the operator to force individual system components to output states, and provide for real time monitoring. The portable, wireless equipment is programmed with information pertaining to the connections and locations of the components in the control network, thereby simplifying diagnosis or testing by the operator.

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KWAC	Draw De
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☐ 2. Document ID: US 6640101 B1

L1: Entry 2 of 29

File: USPT

Oct 28, 2003

DOCUMENT-IDENTIFIER: US 6640101 B1

TITLE: Remote transmission testing and monitoring to a cell site in a cellular communications network

Abstract Text (1):

Systems and methods provide remote performance monitoring and testing to a cell site in a cellular communications network. The systems and methods include a network management center having remote monitoring and testing capabilities utilizing an intelligent customer service unit that traps and makes available alarm information on the transport link.

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KWAC	Draw De
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☐ 3. Document ID: US 6625648 B1

L1: Entry 3 of 29

File: USPT

Sep 23, 2003

DOCUMENT-IDENTIFIER: US 6625648 B1

TITLE: Methods, systems and computer program products for network performance testing through active endpoint pair based testing and passive application monitoring

Abstract Text (1):

Methods, systems and computer program products for testing the performance of a communication network including a plurality of endpoint nodes executing application programs which utilize the communications network are provided. A console node is provided on the network which may initiate operations by test agents executing on one or more of the plurality of endpoint nodes. The agents may generate network performance information using passive application monitoring and/or active endpoint pair based network testing responsive to scheduling instructions from the console node. Specific application programs may be designated for passive monitoring and active test protocols may be provided based on an expected type of application communication traffic. In another aspect of the present invention, one of a plurality of types of transaction models defining the beginning and ending reference point for a transaction timing measurement may be provided to the endpoint nodes for use in passive application monitoring. In a further aspect of the present invention, the endpoint nodes may be automatically discovered by the console node.

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Full	Title	Citation	Front	Review	Classification	Date	Reference				Claims	KWIC	Draw. De
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☐ 4. Document ID: US 6583867 B1

L1: Entry 4 of 29

File: USPT

Jun 24, 2003

DOCUMENT-IDENTIFIER: US 6583867 B1

TITLE: System and method for monitoring optical fiber integrity between the telecommunications provider and a customer's premises

Abstract Text (1):

A system and method of monitoring and testing the integrity of a dedicated pair of optical fibers extending between a telecommunications provider to a customer facility through the optical fiber network, of the telecommunications provider. The system contains an optical transmission module, a monitoring module, and a first wavelength division multiplexing module which are located at the telecommunication provider's facility. A second wavelength division multiplexer module is located at or just prior to the customer's facility. The optical transmission module introduces test signals into the first dedicated optical fiber and which travels to the customer facility through the optical fiber network. At the customer facility, the test signal is looped into the second dedicated optical fiber. The test signal then returns to the telecommunications provider's facility, wherein the test signal is received and processed.

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KMIC	Draw D
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☐ 5. Document ID: US 6519723 B1

L1: Entry 5 of 29

File: USPT

Feb 11, 2003

DOCUMENT-IDENTIFIER: US 6519723 B1

TITLE: Firewall performance monitoring and limited access system

Abstract Text (1):

A protocol analysis access system ("PAAS") and a restricted access method for remotely monitoring and testing embedded channels in a signal communicated over a telecommunications network. The PAAS system is capable of accessing a signal from a network circuit through digital cross-connect systems ("DCSs") or through direct connections. In case of restricted network access, the PAAS performs non-intrusive monitor-only function on the signal without interfering with or interrupting the data flow over the network circuit. In addition, the PAAS system is capable of performing non-intrusive conformance testing on a signal using a protocol analyzer. In case of non-restricted network access, the PAAS system allows full performance testing on a signal. The PAAS system functions are executed by an external command source from a remote network maintenance center via remote control links. The monitor-only and test results are reported back to the remote network maintenance center for further analysis.

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KMIC	Draw D
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☐ 6. Document ID: US 6330587 B1

L1: Entry 6 of 29

File: USPT

Dec 11, 2001

DOCUMENT-IDENTIFIER: US 6330587 B1

TITLE: Real-time multiprocessing computer infrastructure for automated testing

Abstract Text (1):

A system and method for powertrain testing of a powertrain under load using a computer network includes a plurality of computer nodes for monitoring and adjustably controlling the powertrain and applied load for acquiring powertrain data relating to powertrain performance. A shared memory is connected to the plurality of computer nodes for receiving in real time the powertrain data generated by each of the plurality of computer nodes. An integrating computer node is connected to the shared memory for receiving in real time powertrain data and is arranged to send different commands to the plurality of computer nodes as part of a powertrain testing process. Further, the present invention allows for the powertrain testing of a powertrain in deterministic real time to develop the powertrain, as well as create a powertrain calibration.

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KMIC	Draw D
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☐ 7. Document ID: US 6313642 B1

L1: Entry 7 of 29

File: USPT

Nov 6, 2001

DOCUMENT-IDENTIFIER: US 6313642 B1

TITLE: Apparatus and method for testing an arcing fault detection system

Abstract Text (1):

A system for testing an arcing fault detection system in an electrical distribution network having a line conductor carrying an electrical signal between a power source and a load, the arcing fault detection system including a sensor coupled to the line conductor for monitoring the electrical signal and generating a sensor signal representing the electrical signal, the arcing fault detection system generating an arc-indicative signal in response to the sensor signal having characteristics indicative of an arcing fault. The testing system couples the sensor to a test line simultaneously with the line conductor and periodically produces a test signal on the test line. The sensor simultaneously monitors the test signal and the electrical signal and produces a sensor signal representing both the test signal and the electrical signal when the test signal is present on the test line. The arcing fault detection system generates an arc-indicative signal in response to the sensor signal associated with either the test line or line conductor having characteristics indicative of an arcing fault. A diagnostic test integrator evaluates the status conditions of the test signal and the arc-indicative signal and generates a trip signal to trigger the interruption of the electrical signal in response to certain status conditions of the test signal and the arc-indicative signal.

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Full	Title	Citation	Front	Review	Classification	Date	Reference				Claims	KOMC	Draw De
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☐ 8. Document ID: US 6052371 A

L1: Entry 8 of 29

File: USPT

Apr 18, 2000

DOCUMENT-IDENTIFIER: US 6052371 A

TITLE: System and method for the communication of operation and maintenance, administration and provisioning information over an asynchronous transfer mode network

Abstract Text (1):

To support communications system repairability, a scalable multi-level data bit stream, capable of supporting variable bandwidth ATM network access, includes an embedded operation channel used by a transport network management system to support connection maintenance, performance monitoring, path tracing, service management and testing functionalities. The transport network management system effectuates a service specific convergence sub-layer functionality to convert between Common Management Information Protocol (CMIP) formatted operation and maintenance managed objects and a message format for the embedded operation channel data. The conversion comprises a Remote Operations Service Element (ROSE) encapsulation, with the encapsulated data incorporated within the embedded operation channel of the multi-level data bit stream. An interface is provided with the ATM network through an ATM adaptation layer to segment the multi-level data bit stream into a plurality

of ATM cells. Operation and maintenance message communication with the transport network management system is provided for both wireless and wireline communications systems accessing the ATM network.

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KMC	Draw D
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☐ 9. Document ID: US 5917808 A

L1: Entry 9 of 29

File: USPT

Jun 29, 1999

DOCUMENT-IDENTIFIER: US 5917808 A

TITLE: Method of identifying device types on a local area network using passive monitoring

Abstract Text (1):

In a test instrument for testing local area networks (LANs), a method for identifying network device types on a LAN operating according to the TCP/IP protocol suite using passive monitoring is provided. A test instrument is coupled to the LAN to passively receive traffic in the form of frames that are being sent between the nodes on the LAN. The frames being sent may contain information that may be uniquely associated with specific types of network devices such as servers, routers, printers. A frame processor collects and extracts the frame information from the frames, including the message type and source IP address. The frame information is compared against sets of frame types, with each set of frame types uniquely associated with one of the network device types. The device types as detected are added to a station database.

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KMC	Draw D
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☐ 10. Document ID: US 5894566 A

L1: Entry 10 of 29

File: USPT

Apr 13, 1999

DOCUMENT-IDENTIFIER: US 5894566 A

TITLE: System and method for emulating network outages a segmented architecture

Abstract Text (1):

A network emulator capable of emulating an entire restoration network improves the process of testing a centralized system for monitoring, restoration, and control of the system. The network emulator has a segmented process architecture such that emulation of the aspects of the restoration network is realized with discrete process components, including an alarm generator, an alarm feeder and a communications emulator. The alarm generator reads in a user-defined network event, analyzes network topology data to determine the impact of the event, and generates an alarms file specifying the alarms generated by the emulated network in response to the event. The alarm feeder reads additional user input specifying the nature of the event, reads the alarms file and determines the sequencing and timing of each alarm. The alarm feeder then feeds the alarms, in specific order and time intervals, to the communications emulator. The communications emulator emulates the

actual communications of a network with the centralized system being tested. The communications emulator receives the sequenced alarms from the alarm feeder, formats the sequenced alarms into data messages in accordance with the specific type of devices being emulated, and transmits the messages to the centralized system being tested using an appropriate communications protocol.

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KWIC	Draw De
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Clear	Generate Collection	Print	Fwd Refs	Bkwd Refs	Generate OACS
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Term	Documents
MONITORING	267533
MONITORINGS	125
TESTING	303271
TESTINGS	871
NETWORK\$	0
NETWORK	298952
NETWORKA	6
NETWORKABILITY	17
NETWORKABLE	119
NETWORKACCESS	1
NETWORKACCESSIBLE	1
((NETWORK\$ WITH MONITORING WITH TESTING).AB. ).USPT.	29

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☐ 11. Document ID: US 5817929 A

L1: Entry 11 of 29

File: USPT

Oct 6, 1998

DOCUMENT-IDENTIFIER: US 5817929 A  
TITLE: Viscosity monitoring system

Abstract Text (1):

A corrugator paste or adhesive manufacturing system provides a viscosity testing tank which is separate from other tanks used in the system. Separate storage tanks are provided for storing each of a plurality of different pastes or adhesives. A closed loop system or network of pipes circulates paste or adhesive from a mixing tank or tanks and from each of the storage tanks through a viscosity monitoring station, and then back to the storage tanks after a viscosity test is performed in the testing tank. An electronic control circuit allocates a time for giving each tank access to the viscosity monitoring station and for comparing the measurements during each such time with a pre-stored criterion for the paste or adhesive that is then being measured. If the viscosity read at the monitoring station corresponds to the stored criterion, the adhesive is returned to its proper storage tank. If there is no such correspondence, various controls may be automatically operated to correct the composition of the paste or adhesive. If the viscosity reading indicates that the adhesive is hopeless, suitable valves are operated to dump an entire batch of said adhesive.

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KMIC	Draw D
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☐ 12. Document ID: US 5712942 A

L1: Entry 12 of 29

File: USPT

Jan 27, 1998

DOCUMENT-IDENTIFIER: US 5712942 A  
TITLE: Optical communications system having distributed intelligence

Abstract Text (1):

The invention is embodied in a distributed intelligence optical fiber communications system capable of fully automated and continuous monitoring and testing of the optical fibers and their connections within the optical fiber distribution frames therein. In particular, it is an optical communications system having an optical distribution frame including interconnection modules having actively intelligent microcontrollers thereon. Also, the distribution frame includes inventive electrical and optical interconnection fabrics between the distributed intelligence located on the interconnection modules and a host located



outside of the distribution frame. The distributed intelligence interconnection modules allow monitoring, testing and/or related activities of the overall optical communications system to be performed locally at the interconnection modules. Also, when used in combination with the electrical and optical interconnection fabrics, the inventive modules substantially reduce optical fiber routing and enable more effective monitoring and testing operations to be performed, while maintaining compatibility with existing conventional cross-connect, switching and network architectures.

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KWIC	Draw. D.
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☐ 13. Document ID: US 5705929 A

L1: Entry 13 of 29

File: USPT

Jan 6, 1998

DOCUMENT-IDENTIFIER: US 5705929 A  
TITLE: Battery capacity monitoring system

Abstract Text (1):

A method of and apparatus for centrally monitoring the capacity of batteries in a battery string includes electrical leads connected to each battery terminal of the battery string. A capacity testing system a) switches between the electrical leads for sequentially selecting the leads associated with the terminals of each battery, b) measures the internal resistance of the battery associated with each selected pair of electrical leads, c) compares the internal resistance of each battery cell to an internal resistance threshold, and d) triggers an alarm when the internal resistance of a battery exceeds the internal resistance threshold. A central monitoring station monitors battery capacity data and alarm signals from various battery strings, schedules battery capacity testing, transmits control commands to each capacity testing system for i) scheduling testing, ii) initializing upload of capacity data, and iii) requesting status information, provides battery capacity data analysis, and uploads information to a network management computer. The system is especially suitable for centrally monitoring the capacity of batteries located remote from the central station, preferably in external telecommunications housings and telecommunications power rooms.

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KWIC	Draw. D.
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☐ 14. Document ID: US 5566161 A

L1: Entry 14 of 29

File: USPT

Oct 15, 1996

DOCUMENT-IDENTIFIER: US 5566161 A  
TITLE: Adaptive DS1 frame format conversion device for remotely monitoring and testing the performance of telephone circuits

Abstract Text (1):

An improved network interface unit (NIU) for remotely monitoring and testing the performance of DS1 telephone circuits, installed on the network side of an

interface between customer premises equipment (CPE) and equipment provided by the network provider. The inventive NIU is used to non-intrusively collect and transmit full-time performance monitoring data to the network provider. The inventive NIU provides continuous and non-intrusive performance monitoring of DS1 transmission systems. With the inventive NIU installed at the interface between the customer's CPE and the LECs' equipment, network service providers are alerted to potential problems before they adversely affect the service provided by the network providers to their customers. The inventive NIU enables a network service provider to quickly and non-intrusively determine whether a problem exists in the equipment provided by the network provider or in the equipment on the customer's premises. The inventive NIU, therefore, advantageously eliminates false dispatches and expensive and unnecessary troubleshooting required by prior art network interface units. The inventive NIU provides nonintrusive monitoring of CPE by facilitating the conversion of CPE-generated signal frame formats to the Extended Superframe Format (ESF) (according to the ANSI T1.403 Standard with Performance Report Message). The present invention performs an adaptive real-time DS1 circuit frame format conversion.

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KWAC	Draw D
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☐ 15. Document ID: US 5451839 A

L1: Entry 15 of 29

File: USPT

Sep 19, 1995

DOCUMENT-IDENTIFIER: US 5451839 A

**\*\* See image for Certificate of Correction \*\***

TITLE: Portable real time cellular telephone and pager network system monitor

Abstract Text (1):

A portable real-time monitoring system for field testing and troubleshooting a cellular telephone network, paging network, or mobile radio system employs a user friendly interface between a user and a scanning radio receiver which displays, monitors and stores parameters related to real-time performance. A portable all-band radio receiver capable of receiving cellular and paging frequencies is connected to a computer, such as, for example, a lap-top computer suitable for mobile operation at remote sites, personal computer (PC) or workstation. An interface circuit is installed within the radio receiver which taps available signals within the receiver as well as allows the computer to control the receiver frequency selection, band designation and demodulation setting. The interface hardware and microcode cooperate to process and decode received signals according to cellular and paging network industry standards. An application running on the computer is provided which utilizes the processed signals to permit complete automated reception, display and storage of cellular, paging, and mobile radio data as well as the signal strength (RSSI) for each signal. All monitored activity is displayed on the PC screen and is written to a disk in an organized ASCII or HEX file for instant retrieval and analysis. Masks can also be specified by the user which allow only selected data to pass or not pass through the system. The masks may be used to trigger alarms and print data when selected data is detected.

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KWAC	Draw D
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☐ 16. Document ID: US 5434846 A

L1: Entry 16 of 29

File: USPT

Jul 18, 1995

DOCUMENT-IDENTIFIER: US 5434846 A

TITLE: Process and apparatus for supervision and/or testing of an ATM-type telecommunications network

Abstract Text (1):

A process for monitoring a network which conforms to an Asynchronous Transfer Mode process standard including reading conveyed cells at a point (P) in the network (R), performing a preprocessing step which includes reformatting cells that have been read, selecting cells that are useful for execution of testing operations, recalculating at least a portion of check information, and arranging the recalculated check information and the received check information into messages, processing the messages in order to verify the coherence between the recalculated check information and the received check information.

Full	Title	Citation	Front	Review	Classification	Date	Reference				Claims	KWIC	Draw D
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☐ 17. Document ID: US 5365515 A

L1: Entry 17 of 29

File: USPT

Nov 15, 1994

DOCUMENT-IDENTIFIER: US 5365515 A

TITLE: Network monitor and test apparatus

Abstract Text (1):

An apparatus for monitoring and testing a twisted pair, particularly useful for an Ethernet network. First and second DC currents alternated with one another are applied to both ends of the line, asynchronously. By monitoring the potential on the line, a determination is made as to the condition of the line. For example, shorted, crossed, improperly terminated or open conditions can be detected. A visual indication of the condition of the line is provided and additionally, the visual indication provides an indication of the traffic level in the network.

Full	Title	Citation	Front	Review	Classification	Date	Reference				Claims	KWIC	Draw D
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☐ 18. Document ID: US 5347225 A

L1: Entry 18 of 29

File: USPT

Sep 13, 1994

DOCUMENT-IDENTIFIER: US 5347225 A

**\*\* See image for Certificate of Correction \*\***

TITLE: Network monitor and test apparatus

Abstract Text (1):

An apparatus for monitoring and testing a twisted pair, particularly useful for an Ethernet network. First and second DC currents alternated with one another are applied to both ends of the line, asynchronously. By monitoring the potential on the line, a determination is made as to the condition of the line. For example, shorted, crossed, improperly terminated or open conditions can be detected. A visual indication of the condition of the line is provided and additionally, the visual indication provides an indication of the traffic level in the network.

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KWIC	Draw D
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☐ 19. Document ID: US 5343461 A

L1: Entry 19 of 29

File: USPT

Aug 30, 1994

DOCUMENT-IDENTIFIER: US 5343461 A

TITLE: Full duplex digital transmission facility loop-back test, diagnostics and maintenance system

Abstract Text (1):

A full duplex digital transmission, high-capacity digital, facility loop-back test, diagnostics and maintenance system having a digital transmission facility, transmission medium, and at least one microprocessor-based, full duplex facility loop-back diagnostics interface is located at predetermined end-user locations within the system. The system is capable of initiating a facility loop-back test and predetermined diagnostics for a predetermined digital transmission span and customer premises equipment at the location of the network interface for a specified end-user. The facility loop-back diagnostics interface has a performance monitoring mode of operation and a maintenance facility loop-back mode of operation. The diagnostics interface can be activated from a remote location and is compatible with and supports a particular protocol, specifically LAP-B protocol. The diagnostics interface has integral performance monitoring capabilities for nonintrusive multiple diagnostics testing and on-line monitoring of multiple predetermined performance characteristics for associated DS1 communications channels, or a specified DS1 communications channel, and customer premises equipment at the network interface. The microprocessor of the performance monitoring unit for the facility loop-back diagnostics interface is synchronized with an internal clock that is driven by conventional power. There is also a long-life battery for preventing historical performance data from being corrupted during a power loss. When the diagnostics interface is in the performance monitoring mode of operation, historical performance data pertaining to predetermined performance characteristics and criteria can be retrieved by utilizing the extended superframe, or superframe, embedded operations channel.

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KWIC	Draw D
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☐ 20. Document ID: US 5260664 A

L1: Entry 20 of 29

File: USPT

Nov 9, 1993

DOCUMENT-IDENTIFIER: US 5260664 A

TITLE: Network monitor and test apparatus

Abstract Text (1):

An apparatus for monitoring and testing a twisted pair, particularly useful for an Ethernet network. First and second DC currents alternated with one another are applied to both ends of the line, asynchronously. By monitoring the potential on the line, a determination is made as to the condition of the line. For example, shorted, crossed, improperly terminated or open conditions can be detected. A visual indication of the condition of the line is provided and additionally, the visual indication provides an indication of the traffic level in the network.

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KWIC	Draw D
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Clear	Generate Collection	Print	Fwd Refs	Bkwd Refs	Generate OACS
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Term	Documents
MONITORING	267533
MONITORINGS	125
TESTING	303271
TESTINGS	871
NETWORK\$	0
NETWORK	298952
NETWORKA	6
NETWORKABILITY	17
NETWORKABLE	119
NETWORKACCESS	1
NETWORKACCESSIBLE	1
((NETWORK\$ WITH MONITORING WITH TESTING).AB. ).USPT.	29

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☐ 21. Document ID: US 5233501 A

L1: Entry 21 of 29

File: USPT

Aug 3, 1993

DOCUMENT-IDENTIFIER: US 5233501 A

TITLE: Digital telecommunication network cross-connect module having a printed circuit board connected to jack switches

Abstract Text (1):

A digital communication network having a digital cross-connect system is described for facilitating the insulation, testing, monitoring, restoration and repair of digital telecommunication apparatus. The system includes a plurality of digital cross-connect modules 10. Each module 10 has an input jack 32, and output jack 34, cross-connect input jack 36 and cross-connect output jack 38 mounted on the front panel for providing front panel access. Each of the jacks is mounted to a printed circuit board having printed circuit board terminals. BNC or TNC coaxial connectors are mounted on the rear panel. The jacks and the connectors are interconnected via printed circuit board traces. Each of the modules has a switch structure for interconnecting jacks and for providing termination before break capability. Each of the jacks automatically interrupts the circuit when a coaxial plug is inserted into a respective jack to isolate the conductor.

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KWAC	Draw D
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☐ 22. Document ID: US 5122800 A

L1: Entry 22 of 29

File: USPT

Jun 16, 1992

DOCUMENT-IDENTIFIER: US 5122800 A

TITLE: Variable successive approximation converter

Abstract Text (1):

Analog electrical signals are converted to digital form by analog to digital sampling in accordance with a variable successive approximation technique that permits extremely wide dynamic range coupled simultaneously with extremely high bandwidth capabilities, low power consumption, and low cost. Each of multiple data (sample) points of the input analog signal are digitally compared to a variable reference generated according to the successive approximation process and changeable modes of that process so as to permit optimum efficiency of conversion at varying rates of acquisition of the input signal. Variable conversion resolutions, gain, and offset settings are offered without resort to amplifiers, AC coupling, or settable attenuators, and applications for this conversion circuitry

and method are described including oscillography, time-domain reflectometry, device and network characterization, telephony, video systems, data logging, equipment self-testing, device and process monitoring and control, spectrum analysis, and logic analysis.

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KUIC	Draw Ds
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☐ 23. Document ID: US 4815104 A

L1: Entry 23 of 29

File: USPT

Mar 21, 1989

DOCUMENT-IDENTIFIER: US 4815104 A

\*\* See image for Certificate of Correction \*\*

\*\* See image for Reexamination Certificate \*\*

TITLE: Digital telecommunications network, cross-connect module

Abstract Text (1):

A digital telecommunication network having a digital cross-connect system is described for facilitating the installation, testing, monitoring, restoration and repair of digital telecommunication apparatus. The system includes a plurality of digital cross-connect modules. Each of the modules has an input jack, an output jack, a cross-connect input jack, a cross-connect output jack, monitor output jack, and monitor input jack mounted on a front panel. Each of the modules has an input switch for cross-connecting an input conductor with a cross-connect input conductor to interconnect the input portion of two items of digital telecommunication apparatus. Each of the modules has an output switch for cross-connecting an output conductor with a cross-connect output conductor to interconnect the output portion of the two items of digital telecommunication apparatus. Each of the switches has means for disengaging the respective conductors when a plug is inserted into a respective jack to isolate the conductor.

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KUIC	Draw Ds
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☐ 24. Document ID: US 4771245 A

L1: Entry 24 of 29

File: USPT

Sep 13, 1988

DOCUMENT-IDENTIFIER: US 4771245 A

TITLE: Earth testing means for an electric fence network

Abstract Text (1):

An earth testing means for monitoring the status of the earth return system of an electric fence network is arranged to indicate the potential difference between the earth return system of the electric fence and a secure earth. In one embodiment the earth testing means comprises an indicator to provide a quantitative display of the fence earth-secure earth potential difference.

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KUIC	Draw Ds
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☐ 25. Document ID: US 4766594 A

L1: Entry 25 of 29

File: USPT

Aug 23, 1988

DOCUMENT-IDENTIFIER: US 4766594 A

**\*\* See image for Certificate of Correction \*\***

TITLE: Digital network system having arrangement for testing digital subscriber line

Abstract Text (1):

A digital network system having an arrangement for testing a digital subscriber line includes a switching device, an exchange terminal device as a subscriber circuit connected with the switching device, a subscriber line connected with the exchange terminal device, a network terminal device at a subscriber's side connected between the subscriber line and terminal equipment devices. The network terminal device includes a turn-around portion for forming a turn-around loop through which the turning-around of a signal to the subscriber line connected with the network termination device is carried out, and a discrimination portion for detecting that data transmission can be carried out and cancelling the formation of the turn-around loop. The turn-around loop is formed when a frame synchronization bit signal from the exchange terminal device is received by the network terminal device and cancelled when the discrimination portion detects that data transmission can be carried out. Communication for either a monitoring of transmission or a bit error testing can be carried out between the network terminal device and the switching device while the turn-around loop is formed, and data transmission between the exchange terminal device and the terminal equipment devices can be carried out after the turn-around loop is cancelled.

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Full	Title	Citation	Front	Review	Classification	Date	Reference				Claims	KNAC	Draw De
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☐ 26. Document ID: US 4680537 A

L1: Entry 26 of 29

File: USPT

Jul 14, 1987

DOCUMENT-IDENTIFIER: US 4680537 A

**\*\* See image for Certificate of Correction \*\***

TITLE: Method and apparatus for testing a conductivity sensing circuit

Abstract Text (1):

A method and apparatus for testing a circuit which senses the condition of an electrical quantity, the sensing circuit having a sensing portion which indicates a predetermined condition of the electrical quantity of a load connected between a pair of sensing terminals, and having a current conducting device which is activated a given time after the sensing portion indicates the predetermined electrical condition. The testing apparatus includes a network which is connected to the sensing circuit terminals for simulating a load having the electrical quantity to which the sensing circuit is responsive, the network having at least one branch which simulates the existence of the predetermined condition in the load, and the network having a timing component causing the predetermined condition to be simulated for a time adequate to test the sensing circuit response but inadequate



to provide sufficient energy to activate the device. The network preferably has another branch for simulating the absence of the predetermined condition in the load, and a switch for selecting which of the branches is connected to the sensing circuit terminals. The testing apparatus also includes monitoring apparatus which is connected to the sensing circuit terminals for comparing the actual response of the sensing circuit to the load simulation provided by the network to the desired response of the network, and the monitoring apparatus indicates whether the actual and desired responses of the sensing circuit are within or without a predetermined range of coincidence.

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KWIC	Draw D
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☐ 27. Document ID: US 4422180 A

L1: Entry 27 of 29

File: USPT

Dec 20, 1983

DOCUMENT-IDENTIFIER: US 4422180 A

**\*\* See image for Certificate of Correction \*\***

TITLE: Control signal transmitting apparatus, particularly for aircraft

Abstract Text (1):

A control system for controlling, for example, the operation of an aircraft or any other system requiring a flow of data back and forth between controlling and controlled units of the system, comprises a passive, multiply intermeshed conductor network (20, 24) of light conductors (11, 12). This network transmits control signals in the form of digital light signals from a control signal source, such as a control stick (9) in the cockpit of an aircraft or spacecraft, to respective controlled servo-units (14). The transmission system includes signal processors (10) including mixers (15) and information devices (16, 17, 18) interposed between the control signal source and the network (24) which is connected to the addressable controlled units, e.g., servo-units. The system is powered by a power supply device comprising several energy sources which may be switched on selectively as required. Such energy sources include the propulsion plant, for example, of an aircraft, an auxiliary turbine (112), a slip wind turbine (120) and an electric battery (128). Each energy source is connected to a measuring and switching unit (106, 115, 124, 131) through redundant transmission units (110) three of which are connected in parallel to one another and to the network (24). The transmission units (110) are further connected through the network (24) to a testing device (135) for monitoring and controlling the connected units or components.

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KWIC	Draw D
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☐ 28. Document ID: US 4385384 A

L1: Entry 28 of 29

File: USPT

May 24, 1983

DOCUMENT-IDENTIFIER: US 4385384 A

**\*\* See image for Certificate of Correction \*\***

TITLE: Modem diagnostic and control system

Abstract Text (1):

A system for diagnosing and controlling operation of a plurality of modems, some located at a central site and others at various remote sites. A processor located at the central site selectively addresses microprocessor test and control units at each modem over a secondary channel. The microprocessor test and control units respond to commands to configure and perform various modem tests, operate autonomously to monitor various alarm conditions, and format status reports and alarm maydays for transmission back to the central processor. The system is capable of performing a wide variety of testing, monitoring and network control functions for a very large network of modems.

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KWIC	Draw D
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☐ 29. Document ID: US 3886323 A

L1: Entry 29 of 29

File: USPT

May 27, 1975

DOCUMENT-IDENTIFIER: US 3886323 A

TITLE: Method and apparatus for testing communications switching system space divided equipment supervisory devices

Abstract Text (1):

A method and apparatus for testing a plurality of space-divided equipment units, such as junctors, of a communication switching system having a switching network for establishing connections between calling and called lines in response to common equipment including a scanner for monitoring supervisory devices of the space-divided units for supervisory purposes, such as ticketing calls through the network, includes establishing a test connection through the network between a test circuit and a supervisory device under test, causing the test circuit to control the operation of the device under test, causing the scanner to sense the operation of the device under test, and determining whether the device under test is able to operate properly in response to the scanner.

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KWIC	Draw D
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Term	Documents
MONITORING	267533
MONITORINGS	125
TESTING	303271
TESTINGS	871
NETWORK\$	0
NETWORK	298952

NETWORKA	6
NETWORKABILITY	17
NETWORKABLE	119
NETWORKACCESS	1
NETWORKACCESSIBLE	1
((NETWORK\$ WITH MONITORING WITH TESTING).AB. ).USPT.	29

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L3: Entry 1 of 4

File: USPT

Feb 11, 2003

DOCUMENT-IDENTIFIER: US 6519723 B1

TITLE: Firewall performance monitoring and limited access system

Abstract Text (1):

A protocol analysis access system ("PAAS") and a restricted access method for remotely monitoring and testing embedded channels in a signal communicated over a telecommunications network. The PAAS system is capable of accessing a signal from a network circuit through digital cross-connect systems ("DCSs") or through direct connections. In case of restricted network access, the PAAS performs non-intrusive monitor-only function on the signal without interfering with or interrupting the data flow over the network circuit. In addition, the PAAS system is capable of performing non-intrusive conformance testing on a signal using a protocol analyzer. In case of non-restricted network access, the PAAS system allows full performance testing on a signal. The PAAS system functions are executed by an external command source from a remote network maintenance center via remote control links. The monitor-only and test results are reported back to the remote network maintenance center for further analysis.

Detailed Description Text (98):

Proceeding to state 276, a technician or operator at the network maintenance center 100 requests setup of the signal path for testing by the protocol analyzer 110 (FIGS. 2,3). Moving to state 278, process 250 routes the signal under test in the interface device to its TAD/FAD port 188' to the protocol analyzer 110 (FIGS. 2,3). At this point in time, the signal is ready to be tested by the protocol analyzer 110. Proceeding to state 280, a technician at the network maintenance center 100, using the ECS 112, commands the protocol analyzer 110 via the control link 117 to test the signal (from state 278). Moving to state 282, the protocol analyzer 110 preferably transmits test results back to the technician at the network maintenance center 100 via the data link 114. In another embodiment, the test results are transmitted to the network maintenance center 100 for processing by an analysis program and the results are provided to the technician or other support personnel. In yet another embodiment, the protocol analyzer 110 performs an analysis of the test results and transmits the analysis results back to the network maintenance center 100. Connection processing process 250 completes at state 284.

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US006519723B1

**(12) United States Patent**  
**Allred et al.****(10) Patent No.: US 6,519,723 B1**  
**(45) Date of Patent: Feb. 11, 2003****(54) FIREWALL PERFORMANCE MONITORING AND LIMITED ACCESS SYSTEM****(75) Inventors:** Lorin D. Allred, Sunnyvale, CA (US);  
Derek J. Nelson, San Diego, CA (US);  
Mark Milliman, La Jolla, CA (US)**(73) Assignee:** Applied Digital Access, Inc., San Diego, CA (US)**(\*) Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 936 days.**(21) Appl. No.: 08/721,184****(22) Filed: Sep. 27, 1996****(51) Int. Cl.<sup>7</sup> ..... G06F 11/00****(52) U.S. Cl. .... 714/712; 714/43****(58) Field of Search .... 371/20.1, 27.5;**  
395/285-289, 490, 491, 183.15, 183.19;  
370/241, 242, 252; 379/100, 93, 34, 60;  
714/712, 715, 18, 25, 43, 47, 39**(56) References Cited****U.S. PATENT DOCUMENTS**

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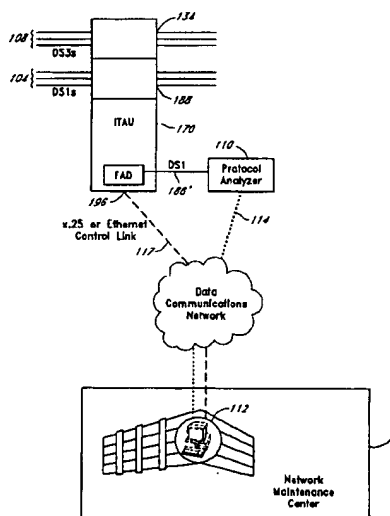
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*Primary Examiner*—Nadeem Iqbal*(74) Attorney, Agent, or Firm*—Knobbe, Martens, Olson & Bear LLP**(57) ABSTRACT**

A protocol analysis access system ("PAAS") and a restricted access method for remotely monitoring and testing embedded channels in a signal communicated over a telecommunications network. The PAAS system is capable of accessing a signal from a network circuit through digital cross-connect systems ("DCSs") or through direct connections. In case of restricted network access, the PAAS performs non-intrusive monitor-only function on the signal without interfering with or interrupting the data flow over the network circuit. In addition, the PAAS system is capable of performing non-intrusive conformance testing on a signal using a protocol analyzer. In case of non-restricted network access, the PAAS system allows full performance testing on a signal. The PAAS system functions are executed by an external command source from a remote network maintenance center via remote control links. The monitor-only and test results are reported back to the remote network maintenance center for further analysis.

**63 Claims, 9 Drawing Sheets**

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L3: Entry 2 of 4

File: USPT

Jan 6, 1998

DOCUMENT-IDENTIFIER: US 5705929 A  
TITLE: Battery capacity monitoring system

Abstract Text (1):

A method of and apparatus for centrally monitoring the capacity of batteries in a battery string includes electrical leads connected to each battery terminal of the battery string. A capacity testing system a) switches between the electrical leads for sequentially selecting the leads associated with the terminals of each battery, b) measures the internal resistance of the battery associated with each selected pair of electrical leads, c) compares the internal resistance of each battery cell to an internal resistance threshold, and d) triggers an alarm when the internal resistance of a battery exceeds the internal resistance threshold. A central monitoring station monitors battery capacity data and alarm signals from various battery strings, schedules battery capacity testing, transmits control commands to each capacity testing system for i) scheduling testing, ii) initializing upload of capacity data, and iii) requesting status information, provides battery capacity data analysis, and uploads information to a network management computer. The system is especially suitable for centrally monitoring the capacity of batteries located remote from the central station, preferably in external telecommunications housings and telecommunications power rooms.

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US005705929A

**United States Patent** [19]

Caravello et al.

[11] Patent Number: **5,705,929**[45] Date of Patent: **Jan. 6, 1998****[54] BATTERY CAPACITY MONITORING SYSTEM**

[75] Inventors: **Ronald G. Caravello**, Boca Raton;  
**David M. Tinker**, Delray Beach; **Roger D. Rognas**, Pompano Beach, all of Fla.

[73] Assignee: **Fibercorp. Inc.**, N. Lauderdale, Fla.

[21] Appl. No.: **448,195**

[22] Filed: **May 23, 1995**

[51] Int. Cl.<sup>6</sup> ..... **G01N 27/416**

[52] U.S. Cl. .... **324/430; 324/434**

[58] Field of Search ..... **324/430, 434, 324/433, 429; 320/48, 15-17; 340/636**

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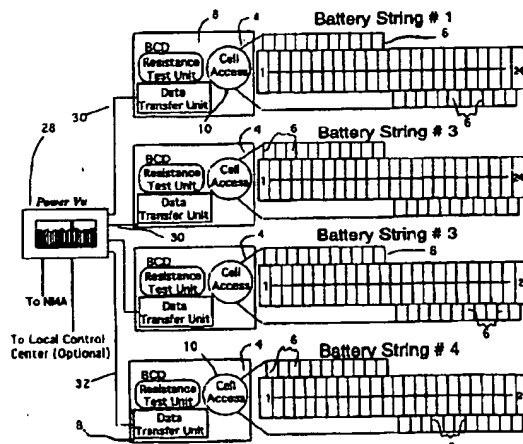
*Primary Examiner*—Sandra L. O'Shea

*Assistant Examiner*—Raymond Y. Mah

*Attorney, Agent, or Firm*—McHale & Slavin, P.A.

**[57] ABSTRACT**

A method of and apparatus for centrally monitoring the capacity of batteries in a battery string includes electrical leads connected to each battery terminal of the battery string. A capacity testing system a) switches between the electrical leads for sequentially selecting the leads associated with the terminals of each battery, b) measures the internal resistance of the battery associated with each selected pair of electrical leads, c) compares the internal resistance of each battery cell to an internal resistance threshold, and d) triggers an alarm when the internal resistance of a battery exceeds the internal resistance threshold. A central monitoring station monitors battery capacity data and alarm signals from various battery strings, schedules battery capacity testing, transmits control commands to each capacity testing system for i) scheduling testing, ii) initializing upload of capacity data, and iii) requesting status information, provides battery capacity data analysis, and uploads information to a network management computer. The system is especially suitable for centrally monitoring the capacity of batteries located remote from the central station, preferably in external telecommunications housings and telecommunications power rooms.

**32 Claims, 9 Drawing Sheets**

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L3: Entry 3 of 4

File: USPT

Aug 30, 1994

DOCUMENT-IDENTIFIER: US 5343461 A

TITLE: Full duplex digital transmission facility loop-back test, diagnostics and maintenance system

Abstract Text (1):

A full duplex digital transmission, high-capacity digital, facility loop-back test, diagnostics and maintenance system having a digital transmission facility, transmission medium, and at least one microprocessor-based, full duplex facility loop-back diagnostics interface is located at predetermined end-user locations within the system. The system is capable of initiating a facility loop-back test and predetermined diagnostics for a predetermined digital transmission span and customer premises equipment at the location of the network interface for a specified end-user. The facility loop-back diagnostics interface has a performance monitoring mode of operation and a maintenance facility loop-back mode of operation. The diagnostics interface can be activated from a remote location and is compatible with and supports a particular protocol, specifically LAP-B protocol. The diagnostics interface has integral performance monitoring capabilities for nonintrusive multiple diagnostics testing and on-line monitoring of multiple predetermined performance characteristics for associated DS1 communications channels, or a specified DS1 communications channel, and customer premises equipment at the network interface. The microprocessor of the performance monitoring unit for the facility loop-back diagnostics interface is synchronized with an internal clock that is driven by conventional power. There is also a long-life battery for preventing historical performance data from being corrupted during a power loss. When the diagnostics interface is in the performance monitoring mode of operation, historical performance data pertaining to predetermined performance characteristics and criteria can be retrieved by utilizing the extended superframe, or superframe, embedded operations channel.

Detailed Description Text (25):

Once notified, the end-user will allow the test system controller 130 to drive a dedicated remote test unit 132 (or the digital cross connect system matrix 116 vis-a-vis the facility data link channel), to allow the digital signal 114 being transmitted by the DS1 origination facility to be electronically cross-connected to the facility access digroup by the network management and administration system 120, which will allow an appropriate command code to be transmitted either in-band (i.e., in superframe format) or via the facility data link (i.e., in extended superframe format) to the facility loop-back diagnostics interface 200 (at reference point 140) in order to loop-back the diagnostics interface 200 to conduct a facility loop-back test. Once the diagnostics interface 200 is looped-back, an appropriate command code can be transmitted vis-a-vis the facility data link channel of extended superframe format using LAP B protocol in order to facilitate down-loading of the previously stored performance data pertaining to the digital signal that is being received and transmitted by the end-user. Alternatively, if a remote test unit 132 is used, the remote test unit 132 will appear as the digital transmit signal 114 from the end-user and would functionally be the apparatus that would communicate with the facility loop-back diagnostics interface 200 in order to either loop-up or loop-down the interface 200. When the facility loop-back diagnostics interface 200 is caused to loop-down, the digital signal is effectively



returned to the end-user for further utilization. The test porting is not necessary if the digital cross connect system 116 is utilized by the central office to loop-up or loop-down the diagnostics interface 200. While the facility loop-back diagnostics interface 200 is conducting a standard loop-back test or is downloading performance data to the digital cross connect system 116, the digital cross connect system 116 would inform the customer premises equipment 120 of the end-user vis-a-vis the facility data link that a loop-up test is currently on-going to determine if there is a problem fault present on the digital circuit of the end-user. Therefore, the standard loop-back test, as well as the down-loading of performance data relative to the DS1 digital signal of the end-user, is an intrusive type of performance test from the viewpoint of the end-user. Once the loop-up code has been sent to the facility loop-back diagnostics interface 200, the operation support and test systems at the central office, or a manual command will be activated at the interface 200 located near the end-user, will transmit a designated command code in LAP B protocol using extended superframe format, to down-load the particular performance data that is resident within designated registers of the associated memory of the facility loop-back diagnostics interface 200, that has been previously stored with respect to that specific DS1 digital signal.

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US005343461A

**United States Patent** [19]

Barton et al.

[11] Patent Number: **5,343,461**[45] Date of Patent: **Aug. 30, 1994****[54] FULL DUPLEX DIGITAL TRANSMISSION FACILITY LOOP-BACK TEST, DIAGNOSTICS AND MAINTENANCE SYSTEM**

[75] Inventors: John C. Barton, Naperville; William J. Hanby, Bloomingdale; Bruce R. Kuhn, Bollingbrook; Michael F. Lathrope, Naperville; Christopher F. Simanonis, Wheaton; Arthur J. Varga, West Dundee, all of Ill.

[73] Assignee: Ameritech Services, Inc., Hoffman Estates, Ill.

[21] Appl. No.: 750,407

[22] Filed: Aug. 27, 1991

[51] Int. Cl.<sup>5</sup> ..... H04J 3/14

[52] U.S. Cl. .... 370/13; 370/15;  
370/17; 375/10; 371/20.1; 371/20.5; 379/1;  
379/5

[58] Field of Search ..... 370/13, 15, 17; 379/1,  
379/5; 375/10; 371/20.1, 20.5

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Primary Examiner—Douglas W. Olms

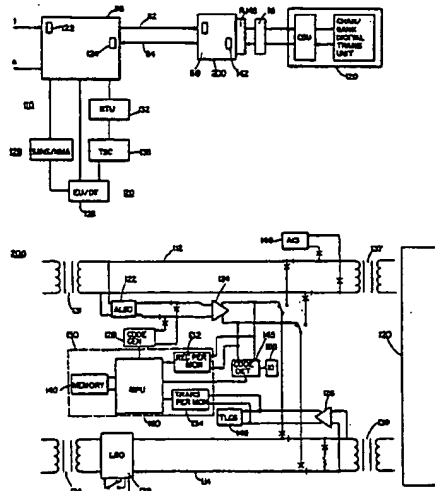
Assistant Examiner—Russell W. Blum  
Attorney, Agent, or Firm—Hamman & Benn

**[57] ABSTRACT**

A full duplex digital transmission, high-capacity digital, facility loop-back test, diagnostics and maintenance system having a digital transmission facility, transmission medium, and at least one microprocessor-based, full duplex facility loop-back diagnostics interface is located at predetermined end-user locations within the system. The system is capable of initiating a facility loop-back test and predetermined diagnostics for a predetermined digital transmission span and customer premises equipment at the location of the network interface for a specified end-user. The facility loop-back diagnostics interface has a performance monitoring mode of operation and a maintenance facility loop-back mode of operation. The diagnostics interface can be activated from a remote location and is compatible with and supports a particular protocol, specifically LAP-B protocol. The diagnostics interface has integral performance monitoring capabilities for nonintrusive multiple diagnostics testing and on-line monitoring of multiple predetermined performance characteristics for associated DS1 communications channels, or a specified DS1 communications channel, and customer premises equipment at the network interface. The microprocessor of the performance monitoring unit for the facility loop-back diagnostics interface is synchronized with an internal clock that is driven by conventional power. There is also a long-life battery for preventing historical performance data from being corrupted during a power loss. When the diagnostics interface is in the performance monitoring mode of operation, historical performance data pertaining to predetermined performance characteristics and criteria can be retrieved by utilizing the extended superframe, or superframe, embedded operations channel.

28 Claims, 23 Drawing Sheets

Microfiche Appendix Included  
(1 Microfiche, 19 Pages)



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L3: Entry 4 of 4

File: USPT

Dec 20, 1983

DOCUMENT-IDENTIFIER: US 4422180 A

**\*\* See image for Certificate of Correction \*\***

TITLE: Control signal transmitting apparatus, particularly for aircraft

Abstract Text (1):

A control system for controlling, for example, the operation of an aircraft or any other system requiring a flow of data back and forth between controlling and controlled units of the system, comprises a passive, multiply intermeshed conductor network (20, 24) of light conductors (11, 12). This network transmits control signals in the form of digital light signals from a control signal source, such as a control stick (9) in the cockpit of an aircraft or spacecraft, to respective controlled servo-units (14). The transmission system includes signal processors (10) including mixers (15) and information devices (16, 17, 18) interposed between the control signal source and the network (24) which is connected to the addressable controlled units, e.g., servo-units. The system is powered by a power supply device comprising several energy sources which may be switched on selectively as required. Such energy sources include the propulsion plant, for example, of an aircraft, an auxiliary turbine (112), a slip wind turbine (120) and an electric battery (128). Each energy source is connected to a measuring and switching unit (106, 115, 124, 131) through redundant transmission units (110) three of which are connected in parallel to one another and to the network (24). The transmission units (110) are further connected through the network (24) to a testing device (135) for monitoring and controlling the connected units or components.

Detailed Description Text (43):

Simultaneously that receiving element in the form of a light sensitive diode or transistor is connected to the demodulator 175 through the receiving circuit 176, which at that instant relates or corresponds to the light conductor 167 of the network 24 to be tested. Thus, the receiving element transforms the light signal into a corresponding electrical current. The demodulator 175 extracts the modulation signal from said electrical current and supplies the signal to an analog-to-digital converter not shown. The analog-to-digital converter supplies a digital signal corresponding to the voltage of the signal to the microprocessor 171. The micro-processor 171 stores the voltage value which has been measured for the respective branch such as the light conductor 167 of the network 24 and compares the measured value with a rated value which has also been stored for this branch 167. Since the testing light signal and the modulation are maintained constant in their amplitude, differences between the rated and measured values can occur only if the tested branch or branches of the network 24 are defective. The micro-processor 171 controls all switching operations to be performed by the transmitter circuit 173 and by the receiver circuit 176. Thus, the micro-processor 171 determines, in accordance with an internal program, the individual testing circuits for all branches of the network 24. The micro-processor 171 transmits or passes on the data corresponding to the instantaneous condition of the network 24 to one of the data processing units of the testing device 135. In order to increase the reliability, it is possible to operate all three of the above described network analysers 163 in a parallel circuit arrangement. For this purpose the respective connecting terminal corresponding to the terminal 178 of the micro-processor 171 is

to be connected to the processing means 137, 138, 139 of the testing device 135. As a practical or suitable manner, the network analyser is constructed as an internal component of the testing device 135.

## CLAIMS:

15. the system of claim 11, wherein said testing means (135) comprise three optronic information handling or processing means (147, 148, 149) operatively connected to said network means for receiving and transmitting information from and to the network means, three data processors (137, 138, 139) operatively connected to the respective information processing means for receiving and transmitting data, each of said data processors having its own memory means (140, 141, 142) for storing data therein, and two micro-processor voter means (143, 144) operatively connected to each of said three data processors for monitoring and sequencing the operation of said three data processors.

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**United States Patent** [19]  
**Wendt**

[11] **4,422,180**  
[45] **Dec. 20, 1983**

[54] **CONTROL SIGNAL TRANSMITTING  
APPARATUS, PARTICULARLY FOR  
AIRCRAFT**

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[21] Appl. No.: **293,277**

[22] Filed: **Aug. 17, 1981**

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[52] U.S. Cl. .... **455/603; 455/612;  
455/617; 244/194**

[58] Field of Search ..... **455/603, 617, 612;  
244/194**

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[57] **ABSTRACT**

A control system for controlling, for example, the operation of an aircraft or any other system requiring a flow of data back and forth between controlling and controlled units of the system, comprises a passive, multiply intermeshed conductor network (20, 24) of light conductors (11, 12). This network transmits control signals in the form of digital light signals from a control signal source, such as a control stick (9) in the cockpit of an aircraft or spacecraft, to respective controlled servo-units (14). The transmission system includes signal processors (10) including mixers (15) and information devices (16, 17, 18) interposed between the control signal source and the network (24) which is connected to the addressable controlled units, e.g., servo-units. The system is powered by a power supply device comprising several energy sources which may be switched on selectively are required. Such energy sources include the propulsion plant, for example, of an aircraft, an auxiliary turbine (112), a slip wind turbine (120) and an electric battery (128). Each energy source is connected to a measuring and switching unit (106, 115, 124, 131) through redundant transmission units (110) three of which are connected in parallel to one another and to the network (24). The transmission units (110) are further connected through the network (24) to a testing device (135) for monitoring and controlling the connected units or components.

21 Claims, 14 Drawing Figures

